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ABSTRACT

As early as 1964, cognitive preference was introduced as a way of describing an individual's preference for applying, relating or questioning information. To determine the role of cognitive preference in the pattern of variables predicting teachers' ratings of students' performance, 44 high school students completed a 61-item cognitive preference test. Teacher ratings were obtained for students' expressive styles, analytic ability, ability to relate ideas and individual initiative. Additional measures of learning style, aptitude and achievement were used in a correlational study (both zero order and step wise) of the pattern of variables best predicting the teacher ratings. The results indicated that cognitive preference was clearly the best predictor of student performance (whether the cognitive preference scores were considered alone or in combination with other widely used measures of learning styles, academic ability, and achievement). This suggests that cognitive preference may be an important individual difference variable in studies focusing on elaborative and semantic processing of information. (JAC)

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COGNITIVE PREFERENCE AND STUDENT PERFORMANCE

A Paper
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of the
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by
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ABSTRACT

As early as 1964, cognitive preference was introduced as a way of describing an individual's preference for applying, relating or questioning information. In this study, a 61 item cognitive preference test was administered to 44 high school students enrolled in English literature. Teacher ratings were obtained for students' expressive styles, analytical ability, ability to relate ideas and individual initiative. Additional measures of learning style, aptitude and achievement were employed in a correlational study (both zero order and step wise) of the pattern of variables best predicting the teacher ratings.

The results indicate that cognitive preference was clearly the best predictor of student preference. An attempt was made to relate cognitive preference to the current concepts, depth of processing and semantic elaboration.

The work of Craik and Lockhart (1972) and Tulving (1972) point to the importance of elaborative processing of information and its linkage in the organized networks of meaning in the enhancement of memory. This work has stimulated a number of studies in which learning conditions have been manipulated to produce greater depth of processing and more positive use of semantic rather than episodic memory.

In contrast to laboratory experiments, classroom learning involves a situation in which the instructional conditions remain constant, and the individual learner structures the situation with respect to the depth of processing or amount of semantic elaboration which he or she will bring to the content. Siegel, Corkland, Capretta, Jones and Berkowitz (1963), for example, found that students' thoughts at a particular moment during a class lecture could be readily classified into one of six categories: passive listening, simple comprehension, applying and utilizing the information, problem solutions or synthesis, evaluation of meaningfulness or accuracy, or forming questions going beyond the presentation.

There is further evidence that the way an individual student chooses to react to informational content may reflect pervasive features of his orientation to knowledge and its acquisition which are so habitual as to constitute a distinct cognitive style. Tallmadge and Shearer (1971) investigating the interaction of 31 aptitude and personality measures with various learning conditions reported that the Kuder computational and

scientific interest scores showed "surprisingly high" correlations with achievement. These investigators found that the highest correlation with achievement (.60) was obtained with scores on the Set Toward Education Scale (Capretta, Jones, Siegel and Siegel, 1963). The Capretta et al. scale is designed to measure predisposition to learn principles, relationships and concepts rather than isolated facts.

Robert Heath (1964) was apparently the first investigator to use the term "cognitive preference" along with specifications for a test to measure this dimension of intellectual style. Heath developed a 20 item cognitive preference test on which students reacted to information from the area of physical science by indicating their preference for one of four modes of attending to the subject matter: Memory for specific facts, practical applications, questioning the information or stating a principle underlying the data.

If cognitive preference tests turn out to be good indicators of the amount of elaborative processing a student is likely to perform while learning new material, then an important variable becomes available to investigators working within the Craik and Lockhart and Tulving framework. The purpose of this study is to examine the relationships among scores on a cognitive preference test, measures of learning processes, aptitude and achievement tests and ratings of performance is an academic area. In searching for appropriate criterion tasks in studies of cognitive preference, it would appear that the criterion variables might well go beyond

list learning, memory for lecture content or course grades. In the present study, the primary dependent variables were four ratings of performance provided by the teacher of two sections of advanced placement high school English. The major objective was to determine the role of cognitive preference in the pattern of variables predicting these ratings as indicated by multiple regression analysis.

Procedure

Subjects. The subjects were 44 sophmore students enrolled in an advanced placement English course in a mid-western high school. The school serves a mixed rural-suburban population composed almost exclusively of white students.

Instruments. Cognitive Preference Test (McDaniel, 1967, 1977) This test contains 61 items in which a brief passage from an American History book is followed by three ways a student might respond to the information: (1) remember the essential idea, (2) identify or emphasize a detail within the statement (3) question, interpret, extrapolate, or generalize from the information. The following example illustrates the nature of the test:

> The American people have not always had trains. It was about forty years after Washington became our first president that our country had railroads. Steam engine trains had been invented and built in England. The first steam engine to run in this country was sent here from England.

It is important to

A. remember that the steam engine was invented and built in England.

B. point out that the steam engine was an important step in the improvement of transportation in our country.

C. find out what date the steam engine was invented.

Inventory of Learning Processes. (Schmeck, Riblich, Ramanaiah, 1977). This inventory consists of a series of items describing activities in which students typically engage while learning new material. Respondants mark each item "true" or "false" to indicate whether the statement characterizes them. The scale yields four scores: Synthesis-Analysis, Study Methods, Fact Retention, and Elaborative Processing. Two scales of this inventory were selected for use in this study:

Synthesis-Analysis. This scale (18 items) was designed to measure the student's ability to organize instructional content and to use Bloom's higher cognitive processes when dealing with material. Examples: "I have trouble organizing the information that I remember." "I can usually state the underlying message of films and readings."

Elaborative Processing. This scale (14 items) was designed to measure the students use of a variety of elaborative techniques in encoding new information: relating it to existing information, using visual imagery, rephrasing, thinking of applications, etc. Examples: "New concepts usually make me think of many other similar concepts." "While learning new concepts their practical

applications often come to mind."

Four scores from the Differential Aptitude Tests (The Psychological Corporation, 1973, 1974) were obtained from the school records:

Verbal Reasoning (VR). Fifty verbal analogies designed to measure the ability to abstract or generalize and to think constructively.

Numerical Ability (NR). Forty items designed to test understanding of numerical relationships and facility in handling numerical concepts.

VR + NR. The sum of the two above tests; considered a measure of general learning ability.

Language. Sixty items designed to measure the ability to detect errors in grammar, punctuation, and capitilization.

Two scores from the IOWA Test of Basic Skills (Houghton, Mifflin, 1974) were also obtained from the school records:

Mathematics Skills. A sixty minute test of mathematics concepts and mathematics problem solving.

Language Skills. A sixty-seven minute test of spelling, capitalization, punctuation and usage.

The teacher of the advanced placement sections of English provided ratings of the performance of the students in her classes. Based on the productions of the students and their class work, the teacher rated each student on four dimensions which she considered important objectives for her course:

Objective 1. Expresses himself not only with mechanical accuracy but also with careful word selection used in a mature style.

Objective 2. Demonstrates the ability to analyze various literary materials of a more advanced nature.

Objective 3. Shows an ability to relate ideas from literature to life; from concrete to abstract or vice versa.

Objective 4. Shows ability to work independently using initiative and creativity.

Students were assigned a rating of 1 to 5 for each of these objectives and an over-all rating was computed by adding the four ratings.

Data Analysis. A correlation matrix was generated for all variables and a multiple regression analysis (forward stepwise inclusion) was performed separately for the ratings of the four instructional objectives and for the overall rating.

Results and Discussion

The results of the zero-order correlations are presented in Table 1.

Examination of the data in Table 1 reveals a number of expected relationships. A cluster of moderate to high correlations exist where scores of the Differential Aptitude Test intersect each other or scores from the IOWA Test of Basic Skills. Also, the teacher ratings on the four class objectives are highly interrelated (.56 to .80). On the other hand, the scores of cognitive processing, synthesis-analysis, and elaborative processing have surprising low intercorrelations, given that all three tests were designed to measure some facet of elaborative processing of course content. Finally, the correlations in Table 1 suggest that cognitive preference is consistently the best predictor of the

teacher's ratings of performance in the advance placement English classes. Synthesis-analysis appears to be the next best predictor and then Verbal Reasoning of the Differential Aptitude Tests.

The step-wise multiple regression analysis performed to determine the patterning of variables which might best predict each of the teacher's ratings failed to produce models which added significantly to the predictions obtained with cognitive preference alone. Recapitulating the relationships of cognitive preference and teacher's ratings, the analysis revealed a correlation of .49 with objective 1 (expresses himself not only with the mechanical accuracy but also with careful word selection used in a mature style), .51 with objective 2 (demonstrates the ability to analyze various literary materials of a more advance nature), .53 with objective 3 (shows an ability to relate ideas from literature to life, from concrete to abstract or vise versa) and .25 with objective 4 (shows ability to work independently using initiative and creativity.

In interpreting these findings, it seems probable that the moderately low correlations among the ratings of performance in English literature and the measures of verbal reasoning and language achievement may be explained in part by the reduction in range of the aptitude and achievement scores as a consequence of the selection of students for advanced English sections. The moderately low correlations obtained between the Schmeck

scales of learning processes and the teacher's ratings of student performance may be attributed to the fact that these scales tend to emphasize elaborative processes that serve memory and retention more than production. The major finding that a cognitive preference test is the best predictor of performance variables in this academic situation (whether the cognitive preference scores are considered alone or in combination with other widely used measures of learning styles, academic ability and achievement) suggests that cognitive preference may be an important individual difference variable in studies focusing on elaborative and semantic processing of information.

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Table 1

Intercorrelations Among All Variables

	Cog Pref	Elab Pro	Syn Ana	VR	NA	VR+ NA	Lang	Lang Skl	Math Skl	Obj 1	Obj 2	Obj 3	Obj 4	Overall Rating
Cog Pref	-													
ElabPro	22	-												
SynAna	23	35**	-											
VR	34*	32*	36**	-										
NA	23	12	02	35**	-									
VR+NA	34**	14	29*	87**	73**	-								
Lang	37**	19	09	46**	23	46**	-							
LangSkl	10	25	24	41**	20	38**	67**	-						
MathSkl	14	04	14	51**	73**	79**	46**	43**	-					
Obj 1	52**	21	34**	23	03	15	32	14	02	-				
Obj 2	49**	17	25*	41**	07	31*	31*	23	07	59**	-			
Obj 3	52**	30*	32*	36**	04	28*	21	17	10	60**	80**	-		
Obj 4	29*	21	21	18	03	14	04	08	02	69**	60**	56**	-	
OvAllRtg	53**	25	33	35**	04	26	25	18	06	83**	88**	86**	84**	-

* sig. < .05

** sig. < .01

Footnote:

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